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AUTHOR Husen, Torsten
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ABSTRACT

A ten-year research effort, conducted by the International Association for the Evaluation of Educational Achievement (IEA), explored the relative merits and failings of different national systems of education in the United States and in Western and Eastern Europe. The first section of this report deals with trends in American education as seen through European eyes. The American system is viewed as a vehicle for upward social mobility and as a means of solving or ameliorating social problems. In the second section, the theoretical framework and research strategy of the IEA are described, as well as the difficulties encountered in comparing systems of education that are widely different in function and philosophy. The way individual differences are perceived and taken into account in organizing formal education in various national systems is considered in the third section. Comparisons are made of the American model of comprehensive education for all students, the Western European model, with early transfer of selected elite students to academic secondary schools, and the Soviet unitary school that integrates all types of schools. The fourth section elaborates on comparisons between comprehensive and selective systems of education. An analysis is made of performance differences in mathematics and science students in divergent systems. An overall conclusion is reached that the American comprehensive system more effectively serves all of the talent of a nation. (JD)

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A Cross-National Perspective on Assessing the Quality of Learning.

Torsten Husén
Institute of International Education,
University of Stockholm

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Trends in American Education - As Seen Through European Eyes.

Education in the American Dream.

The role Americans traditionally have assigned to education is that of a vehicle for upward social mobility. In the early days of the new country, education was seen as a means of developing natural talent essential for the prosperity of the nation. When Thomas Jefferson talked about the "natural aristocracy" he meant those who, irrespective of their social status at birth, possessed outstanding innate talents. Society was obliged to see to it that members of this aristocracy were given the opportunity to develop their talents so as to achieve social positions that matched their natural abilities. The classical liberal concept of equality of opportunity, which is an inextricable part of the American Dream, has been succinctly expressed in a poem by Thomas Wolfe:

> So, then, to every man his chance --
> To every man, regardless of his birth,
> His shining golden opportunity --
> To every man the right to live,

SP 021 799

To work, to become himself,
And to become
Whatever thing his manhood and his vision
Can combine to make him --
This seeker,
Is the promise of America.

Coupled with the strong belief in education as a promoter of individual life-chances has been the confidence in education as a means of solving social problems or, at least, as an instrument for ameliorating them. Horace Mann, who in the mid-nineteenth century was a prominent figure in building America's public school system, conceived schools as tools for alleviating social inequalities and the disadvantages of the working classes. He wrote in 1848:

> "If one class possesses all the wealth and education, while the residue of society is ignorant and poor, it matters not by what name the relation between them may be called; the latter, in fact, and in truth, will be the servile dependents and subjects of the former. But if education be equally diffused, it will draw property after it, by the strongest of all attractions; for such a thing never did happen, as that an intelligent and practical body of men should be permanently poor.... Education, then, beyond all other devices of human origin, is the great equalizer of the conditions of men, the balance wheel of the social machinery." (Quoted from Hechinger, 1976).

The confidence in education as a catalyst in changing society was behind the progressive movement in education between the two wars. The belief in education as a means of eliminating social inequalities was the underlying force behind plans to change American society in the Great Society legislation. When President Lyndon Johnson declared his "War on Poverty" he was quoted as saying:

> "This is going to be an education program. We are going to eliminate poverty by education, and I don't want anybody to mention income distribution. This is not going to be a handout, this is going to be something where people are going to learn

their way out of poverty." (Ashline et al., 1976).

The President's Task Force on Education, chaired by John W. Gardner, which in late 1964 submitted its report, seems to have played an important role in preparing the legislative program for compensatory education of the disadvantaged. Not only did the Task Force confirm an adherence to the traditional tenet by saying, "It should be our objective as a Nation to provide every child with as much education as his talent and drive warrant", it also recommended various steps to be taken to promote access of children of disadvantaged background to normal educational opportunities.

The Task Force pointed out that the American school system so far had done fairly well with the children in "common categories", those who belonged to the mainstream, whereas those at the ends of the spectrum, the exceptionally talented at the one end and the poor and physically or mentally handicapped at the other, had tended to be neglected. The late 1950s had seen efforts to provide more challenging opportunities for the highly talented, but the poor and handicapped were still until the early 1960s left out of the picture, not least with regard to federal support. The Task Force pointed out that "most poor children are to be found in our rural and urban slums, and these slums breed conditions that do in fact diminish the teachability of the child"; the family and neighborhood conditions do not encourage intellectual growth; the schools tend not to attract the best teachers, which adversely affects their quality.

The Sputnik Concerns.

The American high school underwent a rapid expansion of its enrollment during the Great Depression and the following years. The

United States by 1945 was then far ahead of the Western European countries in terms of the percentage of 14- to 18-year-olds who were in school. Secondary, particularly upper secondary, schools in Europe were still open only to a small social and intellectual élite, while a majority was enrolled in the United States. The expanded high school enrollment had strong repercussions on enrollment at the college level - not so much with regard to the average intellectual level of the students as to their general orientation. Earlier the liberal arts programs had dominated; now the vocationally-oriented students dominated the scene.

The changing enrollment in institutions of higher learning led to severe criticism of the public schools. The entering students were considered to be ill prepared and accusations regarding lack of intellectual rigour and quackery were levelled. Dael Wolfe's (1954) study of America's resources of specialized talent, which elucidated the lack of opportunity for high ability students to obtain advanced education, created concern. The orbiting of Sputnik in 1957 further reinforced the criticism of the public school system, particularly of the high school, which was accused of lacking intellectual rigour. The public reaction to what was considered to be a serious lag in American science and technology was something of a shock and led to policy actions on the part of the federal government and Congress that a few years earlier would have been hardly imagined. Legislation was passed in 1958 which provided federal aid to secondary and higher education under the label of the National Defense Education Act with the overall aim of promoting educational opportunities in science and technology. But provisions were also made for improvement in other areas where the system had been considered deficient, such as aid to highly able students, promoting

the teaching of foreign languages, and supporting educational research relevant to the aims of the legislation. Grants-in-aid were made available for certain university studies.

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The concerns of today about American education unmistakingly carry certain features of déjà vue. In the wake of stagflation and receding competitive power on the international market of American industry, the schools have again come under critical review. Are they on the whole providing the intellectual fare that students generally need in our type of society and are they in particular taking care of the intellectually able ones? In the 1960s and 1970s federal programs in education have largely focused on students belonging to the socially and intellectually disadvantaged part of the spectrum. Now the gifted have again come into focus. The competence of public education to provide both equality and excellence has been brought into question.

Background and Historical Setting of Comparative International Assessments (IEA).

The idea of conducting a study of cognitive competence in children belonging to different national systems of education was first brought up at a meeting of educational researchers from a dozen countries at the UNESCO Institute for Education in Hamburg in 1958 (Foshay, 1962). The year before, that institute had hosted an international meeting of educational psychologists on problems of evaluation. This was a field in Europe to which little thought had been devoted at that time. In the United States, through Ralph Tyler's (1950) pioneering research, evaluation had been an area in which educators took great interest.

It was in 1958 realized how little empirical evidence was available to substantiate the sweeping judgments that were commonplace about the relative merits and failings of various national systems of education. Concerns about the quality of secondary education in general - science education in particular - had begun to be aired in the United States by Admiral Rickover (1959) and the history professor Arthur Bestor (1953). American schools were under attack, accused of a lack of intellectual rigour and standards. Similar concerns had begun to crop up in other countries, where secondary education was in the process of becoming universal. These concerns reached their peak in connection with the launching of Sputnik, an achievement ascribed, in the last analysis, to superior education in the Soviet Union. At research meetings during the late 1950s the lack of internationally valid standards for student competence in key subject areas was pointed out. The level of student competence was at the center of concerns about standards.

Given the lack of hard evidence, the question arose: Why not study the experiences gained in some countries from large-scale testing programs - particularly the Anglo-Saxon countries - and the survey techniques that had begun to be employed in the spirit of American positivism? These techniques had already made their way into authoritative handbooks of social science research. Given the state of the art of cross-national social science research, the development of instruments was quite an achievement. A proposal was put forward for a cross-national study of how schools contribute to shaping the cognitive development of children in different countries. A feasibility study was launched with the purpose of finding out whether, methodologically and administratively, instruments could be developed that were cross-nationally valid and could be administered uniformly over a range of countries with different school systems. One also wanted to find out whether data could be made accessible in order to make the processing of data and statistical analyses possible at one central place.

Data were collected in a dozen countries, and the outcomes of the analyses were reported at a meeting in Hamburg in 1961 (Foshay, 1962). There being no time for a laborious, time-consuming exercise of test development, those in the group who were experts in test development drew upon items already available, most of them from England the United States. A 120-item omnibus test measuring competence in reading comprehension, arithmetic, science, and geography was put together. Some nonverbal, "culture-free" items measuring abstract reasoning of a type that the British were using were included in order to assess nonverbal intelligence. The participating national centers made the data available to Teachers College, Columbia University, where processing and most of the statistican analyses

took place.

The results of the feasibility study were assessed positively, and the decision was made to proceed with a 12-country study in mathematics. Mathematics possesses a universal language and a high degree of cross-national overlap in school curricula and was a subject for which the development of standardized tests appeared to be rather straightforward and without problems encountered in developing tests for disciplines, such as civic education.

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The organizational "machinery" had to be set up for a research effort, which would span the next decade and cost at least 1 million preinflation U.S. dollars. The resulting organization was called the International Association for the Evaluation of Educational Achievement, which became known under the acronym IEA. The decision-making body on matters of overall policy and operational implications was the IEA Council, on which each institution had one representative. The council had at least one statutory meeting per year. Between council meetings, decisions could be made either by a standing committee that met more frequently or by the chairman of the organization. The chairman had at his disposal a full-time coordinator. The IEA was, until 1967, a loose association; at that time it incorporated itself. Before that, it could not sign contracts on research grants. A generous grant was made available in 1962 from the United States Office of Education cooperative research program. An international consortium of researchers and/or research institutions conducting research, such as the IEA one, must be incorporated in order to act with a degree of autonomy. Some of the participating

national research centers were either completely private and autonomous, such as the National Federation for Educational Research in England and Wales (NFER) or the Graduate School of Education at the University of Chicago, which "represented" England and the United States, respectively, on the IEA Council. Other national research centers were institutions within state-controlled universities that by tradition were autonomous in their research projects once they were funded. But government support had to be solicited in terms of funds and endorsement gained from schools and the teachers' unions. This could be quite tricky for studies with important implications for national policy in education. In some countries, such as Hungary and Japan, the national research center responsible for the study was either part of, or reported directly to, the Ministry of Education. This had two implications. In the first place, once the government had decided to participate, the necessary funds were made available. Second, the schools were obliged by ministerial order to cooperate, even if clashes with a teachers' union could result.

The Image of an "Olympic Contest".

Because the IEA research ventures were launched during the post-Sputnik period, our cross-nationally comparative study was inevitably affected by the climate created by the race for superiority in science and technology. As early as the 1950s many Americans believed that the fight for world supremacy had to be fought in classrooms by increasing the number of students who took science and by raising educational standards. The National Defense Education Act was passed in the fall of 1958 for the purpose of strengthening the infrastructure

of American technology. Massive resources were made available in the United States for programs to upgrade mathematics and science curricula and instruction. When the IEA study was launched, what in the minds of some academics was perceived as a major exercise in basic research was perceived by others as an international contest in mathematics. Now, it would at last be possible to find out which country scored highest.

In early 1967, when the two volumes (Husén, 1967) that reported the outcomes of the 12-country mathematics study were released, there were press briefings in London, in connection with an IEA Council meeting, and in Chicago. At the first, great efforts were made to play down the "horse race" aspects by referring to the fact that countries had different curricula. We pointed out that differences in average performance between countries could not without great reservations be interpreted as reflecting differences in the efficacy of mathematics education because of the impact of social and economic factors on student competence. Furthermore, the structure and selectivity of the systems played an important role. Although 13-year-olds in England and Germany, who had transferred to academic, selective secondary schools, had already been confronted with algebra and geometry, this was generally not the case in Sweden and the United States, the two countries with the lowest average performance at that age level. Despite efforts to point out such causes for differences in national scores, the outcry was tremendous in both these countries.

Theoretical Framework and Research Strategy.

IEA wanted, first, to develop internationally valid measures of student competence in the key subject areas. Second, it wanted to measure the "input" of money, teacher competence, teaching materials, teaching time, and method of instruction in the educational process. Finally, these inputs had to be related to "outputs" in each country in terms of student achievements and attitudes. Then one would be in a position to determine the relative importance of various "input" factors.

In hindsight this appears to be a rather simplistic conceptualization. We should keep in mind that the IEA survey was conceived before such massive attempts as the Coleman report, the Plowden Commission, and the Jencks study had been made to disentangle the relative importance of home background and schooling. The more sophisticated methods of multivariate analysis employed in these and other studies had not yet provided a more realistic picture of what was possible within the framework of a cross-sectional survey approach.

The theoretical framework employed in the 12-country feasibility study and the early mathematics survey was a rather primitive one. At that stage one simply wanted to employ quantitative methods in comparative education research, which had previously been historically and qualitatively oriented. During the Sputnik period, judgments about the relative merits and shortcomings of national systems of education had been plentiful but without systematic empirical backing. There were no international standards that could be expressed operationally in test or examination scores. There were no instruments by means of which one could assess cross-nationally the level of

student competence in various systems. The group of researchers that coalesced in the early history of IEA, who possessed a solid background in psychometric methods and an interest in evaluation, set about to develop the instruments required.

The following categories of variables were included in the Six Subject Survey. On the output side we had (1) measures of cognitive outcomes of instruction as assessed by standardized achievement tests and (2) measures of affective outcomes, such as student attitudes toward schooling in general and the particular disciplines.

Great caution had to be exercised in interpreting student cognitive competence as an outcome of schoolteaching only. Family background was of great importance by the time of school entry. Parental help and concern continued to influence student progress throughout the school career. Given the same quality of teaching, children from illiterate homes could not be expected to reach the same level of competence as those with educated parents. The interpretation of affective measures was more tricky because one could not, with a cross-sectional design, determine the extent to which a certain attitude or level of motivation was an input to or an output of the school experiences of a child. Measures, such as Like School and School Motivation, that could not unequivocally be assigned to either the "input" or the "output" side, were labeled "kindred" variables.

"Comparing the Incomparable".

It has been pointed out that comparing the outcomes of learning in different countries in several respects is an exercise in "comparing the incomparable". One is dealing with school systems with different objectives and curricula which in their turn reflect different national goals.

In comparing the outcomes of learning in the United States with those of "comparable", i.e., highly industrialized countries in Western Europe, which, for example, was done in the first IEA mathematics survey of 12 countries (Husén, 1967), one tends to overlook certain basic differences between the school systems. This was the case in interpreting the mean scores for the 13-year-olds which were lowest in the United States and Sweden, respectively. The difficulties in conducting meaningful comparisons between countries in terms of what students achieve when tested, for instance, by standardized achievement tests, could be summed up as follows:

(1) The United States differs from Europe in terms of the structure of the formal system of education. In Europe, there has historically up to the present time been a cleavage, both intellectually and socially, between primary and secondary education. Secondary schools existed for a small élite which did not go to public primary but to private, preparatory schools. A classical curriculum prepared for the university. Secondary schools were usually under the control of central government, whereas primary schools legislated in the mid-19th century were established with strong local influence, although often with considerable central financing.

Until the 1960s, children who went to secondary schools with an academic program transferred from grade 4 or 5 of the primary school and completed an additional 6 to 9 years in secondary school.

In the United States, secondary schools are under local school boards and have for a long time been far less selective than the corresponding European schools.

(2) Governance and financing. Most European systems are rather centralized, with both primary and secondary education under the supervision of state inspectors who report to a central agency, as a rule a ministry of education. Germany, France and England are, in spite of many differences, rather similar with respect to centralization. Secondary schools are almost entirely and primary schools partially financed by appropriations of the national parliament and under the authority of the national ministry of education.

In the United States, much local financing and to a considerable extent local initiative mean a strong influence of local school boards.

(3) The college is a specific American phenomenon with practically no European counterpart. Its program corresponds partially to the upper part of academic secondary schools in Europe; such as Sixth form in England or classes préparatoires in France. It is, for reasons further elaborated below, not very meaningful to compare the entire population of high school seniors with their age mates in highly selective academic programs in, for instance, Germany or France.

(4) As said above, European secondary schools have historically prepared a small, ascriptive élite for the university. As late as in the mid-1960s, only 9 per cent of the relevant age group in Germany graduated from upper secondary school as compared to some 75 per cent in the United States (Husén, 1967). The former group was almost entirely university-bound, whereas the latter was "comprehensive" in two major respects, namely with regard to (1) size of enrollment in per cent of the relevant age group, and (2) range of programs from

highly academic to highly "practical" or vocational ones. There is evidently no point in comparing the quality of learning in a system with high participation rate with that of countries with very low rate. The former will obviously show a lower average performance than the latter. In the IEA mathematics study a comparison was made of the average performance of the top 9 per cent in the 12 participating countries. Similar comparisons were made in the science survey in 19 countries (Comber & Keeves, 1973).

One could say that "comprehensivization" means that equality is achieved at the cost of quality in terms of average performance. But both the mathematics and the science international surveys demonstrated that the top 5-10 per cent at the end of secondary education, i.e., the élite, tended to perform almost at the same level both in comprehensive and selective systems of secondary education. Thus, the élite among U.S. high school seniors did not considerably differ in their performance from their age mates in France, England or Germany. In the comprehensive systems, where the net is cast more widely, the result is a bigger "talent catch". In addition, those who are less able get an opportunity of developing their potential, which is not the case in selective systems of the traditional European type.

(5) The spread between national systems in terms of average performance in key subjects, such as mother tongue, mathematics and science, between highly industrialized countries turns out to be rather narrow in comparison with the enormous quality gap between, on the one hand, industrialized and, on the other, non-industrialized countries, that is to say, developing countries. Students from the latter category tend, in reading and arithmetic, to achieve the U.S.

third grade level after some 7 years of schooling or the eighth to ninth grade level at the end of upper secondary school. This performance gap is only partly accounted for by the school resources. On the whole, school resources expressed in unit expenditures in affluent countries tend to be rather unrelated to the quality achieved. Thus, the unit cost in the Swedish comprehensive school has almost doubled in constant dollars from 1962 (when the reform was legislated) to 1977, but learning in terms of student average performance has not changed considerably (a small increase has been found in average mathematics performance).

(6) Opportunity to learn tended in the IEA Six Subject Survey to be the single factor with the highest explanatory power. In school subjects, where learning starts from scratch, this is very striking. Carroll (1975), who was in charge of the IEA study on French as a foreign language, compared eight countries in terms of time factors, such as how many years French was taken, when it was introduced in school and how many periods of instruction per week were given. The United States, with only two years of high school French, showed a dismal outcome, whereas Roumania, with some six years, was at the top.

National Examinations in Europe.

In Europe, there are as a rule no national or regional examinations at the end of primary school which until recently in many cases has marked the end of mandatory school as well. In some countries it is felt inappropriate to conduct examinations that aim at assessing the individual level of performance in a system where school attendance

is mandatory. Failures depend not only upon limitations in individual ability and motivation but on the competence of the system as such to cater to all students and to bring everybody to the optimum of his capacity.

However, nationally set standardized surveys of student achievement in key subjects, mainly mother tongue and mathematics, have been conducted in some countries. Thus, since the 1940s all Swedish students in grades 2, 4, 6 and 8 were given standardized tests. These tests were, however, as shall be explained later, not used as instruments to assess the individual student but to calibrate the setting of marks in order to achieve national comparability.

The upper secondary school examination was in many European countries - and in some of them still is - a uniform entrance ticket to the university. Such examinations have predominantly been set and organized by central agencies, as a rule by the ministries of education. This means that such examinations as the baccalauréat in France or the Abitur in Germany have been mainly external to the school which the student attends. Usually such examinations consist of a written part with papers set by the central agency and an oral part, where the examination is conducted either by outside examiners or by the teachers from the school of the student.

By and large, universities in most European countries until recently had a strong influence in determining what emphasis should be placed on the various subject areas and what topics within these should be particularly stressed. The background of this was that most students who graduated from upper secondary school went to the university. Typically, the upper secondary school examination in some countries was called the matriculation examination.

The development in Sweden is in some respects typical of changes

that have occurred in Europe. Until 1868 the universities themselves conducted a comprehensive matriculation examination, which qualified for university entrance. For a period of 100 years, until 1968, the matriculation examinations were conducted at the upper secondary schools, the gymnasia, but still with a considerable control exercised by the universities which were the recipients of the majority of graduates. The written papers were set by the National Board of Education which also assigned a large number of university professors as "censors" in the oral exam. The content of the papers was determined after consultation with the universities.

Such a system could work as long as those, who took the upper secondary school leaving examination, consisted of a small élite, which in Western and Northern Europe as late as by 1950 consisted only of some 10 per cent of the age group. But when the secondary school enrollment soared with explosive force from the mid-1950s until the early 1970s and exceeded 20 per cent of the age group, and when the upper secondary programs became more diversified and not necessarily university-preparatory, a uniform school leaving examination did not work any longer. When a high percentage of students took vocationally-oriented programs, the main purpose of guaranteeing that the graduates had become equipped with an appropriate level of academic competence was not justified any more. In Sweden, the system with centrally set, written examinations and oral examinations under the supervision of university professors was replaced by a system of full-time gymnasium inspectors, similar to the French system of inspecteurs. Apart from advising the teachers in the secondary schools, the inspectors should see to it that comparable standards were maintained in the various schools. The reason for securing comparability in marking the students was that graduates

from different schools were competing with each other for entry to selective studies at the universities. In addition, the central educational agency, the National Board of Education, prepared standardized achievement tests that were used by the teachers in assessing the relative level of performance achieved in their respective classes. Such tests served the double purpose of helping the teachers to calibrate their marks and to provide the Board with information about the level achieved over time in the country as a whole.

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Thus, European secondary education has in certain respects - with a considerable time-lag, however - experienced some of the same problems as those earlier encountered in the United States. With the massification and diversification of upper secondary education and with the decreasing academic emphasis the universities have tended to lose both interest and influence on secondary education - apart from complaining about the poor grounding in many of the students they receive. This, as far as Europe is concerned, is a natural effect of the quadrupling of university enrollment from the early 1960s to the early 1970s.

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Examinations at the undergraduate level at most European universities for a long time consisted of written (essay) and oral examinations in combination. The oral examinations played a prominent role. The professor examined the individual student on a certain, often large, amount of assigned reading. Rather frequently such an

examination was comprehensive in nature, whereby the student was examined on the entire course of study for one year or more. This system worked as long as the number of students per course was relatively low but was doomed to fail when the enrollment in the late 1950s and the 1960s grew manifold. Written objective examinations with multiple choice responses and machine scoring began to enter the scene. The limitations of such tests are well known, not least by the American debate on their use. In Europe they happened to be introduced at a time when the student radicalism began to sweep the universities and when examinations, irrespective of their mode, were regarded as a "repressive instrument employed by the State in the service of the leading class". Examinations began to be rejected in principle. They were considered to foster a competitive spirit instead of cooperativeness. Many students demanded "group examinations" in which either one spokesman reported on behalf of the entire group or the group collectively worked out answers to examination questions.

From Absolute to Relative Assessments.

A pervasive feature of most European, nationally-set examinations for a long time was that student performance was assessed against an absolute standard. The key element was the minimum requirement for obtaining the pass mark which, in its turn was conceived as the minimum requirement for profiting from university teaching. In case the aim of the examination was to assess the student's academic ability, the important thing was to judge the competence for university studies.

In some, but for a long time rather few instances, marks above the pass/fail one were important for admission to selective programs. But since most secondary final examinations were conducted with the purpose of sifting out those who did not meet general qualifications for university entrance, the important thing for the individual students was to obtain a pass.

The nature and the consequences of the final secondary examinations in Europe have changed during the last 20 years, when enrollment in upper secondary education soared from some 5-10 per cent to 20 or more of the relevant age group. At the same time, education has begun to be seen as a decisive factor in employment opportunities and in social mobility. Until the late 1950s a very low percentage of young people from working class homes (1 to 3 per cent) went to upper secondary school and from there to the university. The enrollment explosion in secondary schools was accompanied by a "revolution of rising expectations" (Husén, 1979). University enrollment began to soar as well and within a period of 10-15 years there was a quadrupling of enrollment. Students were flocking to an increasingly diversified offering of programs, many of which with a vocational orientation.

The paradox occurred that in spite of the enormous increase of places at institutions of higher learning competition became considerably tougher. Universities that previously had been mainly socially selective tended to become intellectually selective as well. The employment system has increasingly begun to use the amount of formal education as the first criterion of selection among job-seekers. Selection for furthergoing education increasingly began to be based on examination marks. This has in Europe over a short period brought

about a change in the concept of assessing the quality of learning. Students selected for upper secondary school and then for the university tend no longer to be assessed against an absolute standard, i.e., whether they had reached the pass mark, but are ranked according to instruments that scale their performance both upwards and downwards. The main feature of the examination system has tended to be the relative, not the absolute, standard. The former can be assessed by means of standardized achievement tests that can also serve the purpose of relativizing marks given by the teachers.

Effects of National Examinations on Teachers and Students.

Given the fact that national examinations in Europe are set on the basis of centrally issued, national curricula and that they are uniformly scored, they tend to have a strong "backwash effect" on the teaching that goes on in the schools. Similar effects are achieved by the examinations for selection for secondary grammar school in England, the so-called 11+ examinations, and by the centrally issued standard tests in the Swedish schools. There is, for instance in Germany, quite a lot of complaint on the part of the parents about the Leistungsdruck (achievement pressure), exerted by examinations which tend to become more and more important in determining the educational careers. There is, however, among teachers a strong opinion that examinations in general, and particularly "home-made" examinations that the teachers administer regularly in order to check the progress of the students, have a motivating effect and that promotion and marks are not just something that students get for free.

Educated talent is modern society's substitute for distinction by social origin and inherited wealth. In other words: one can begin to see a strong meritocratic tendency, particularly in the industrialized societies. In spite of immensely increased opportunities for further education and a manifold increase of places in institutions of furthergoing education, competition, particularly for university entrance, has mounted (Husén, 1979). This tends to have strong repercussions on the lower levels of the system and to bring about the Leistungsdruck referred to earlier above. The meritocratic tendency is reinforced by the increasing practice of the employment system to use the amount of formal education as the first criterion of selection among those applying for jobs. This means that in order to secure a good place in the line of job-seekers one has to climb as high up on the educational ladder as possible. In order to gain such a position one has to scramble for good examination results and marks.

These tendencies have repercussions on the learning that goes on in the classroom. Students tend to learn for external and to a lesser extent for internal rewards. Under such conditions quite a lot of superficial ritualism is fostered to the detriment of the pursuit of genuine educational values. Career orientation and excessive pragmatism tend to take precedence over learning for personal fulfillment and lead to a neglect of the more intangible benefits that accrue to those who enjoy studying for its own sake.

Diversity Versus Unity: A Comparative Perspective

Introductory Observations.

The way individual differences are perceived and taken into account in organizing formal education in various national systems is, indeed, worthy of study from a comparative point of view. The way individual differences are perceived with regard to origin and size as well as the practices that ensue from these perceptions reflect differences between political ideologies closely related to social and economic orders that vary from country to country.

Problems related to individual differences and their policy implications surfaced when society began to change from an ascriptive one, where everybody had to remain in the class or caste into which he was born, to a society of mobile social status where status attainment increasingly depends on educational achievements. Problems of differentiation and uniformity of school provisions are products of the age of the liberal philosophy of equality of educational opportunity.

The need to clarify conceptually the heredity-environment issue is of utmost importance since otherwise quite wrong policy implications might be drawn. It cannot be emphasized strongly enough that heredity is not a status, a kind of fixed point, but a process. The hereditary component of a personality trait, say scholastic ability, can only be inferred from a process of development that is not directly accessible to observation and/or measurement.

Before attempting to review how the diversity-uniformity problem has been dealt with in various national systems of education, which operate under different social and economic orders and with

different historical background, I should like to deal briefly with the equality problem which has taken such a prominent place in recent educational policy and rhetoric.

Considerations about diversity and unity in education have a long history in Western Europe and North America that go back to Helvetius and to Rousseau's famous Discours sur l'Inégalité parmi les Hommes of 1755. Since all human beings have the same political rights, as reflected in their right to vote in general elections, they also have the same right to basic education. The issue over the last decades has been to what extent this provision should be common or not, that is to say, how far up in the system children from all walks of life should be accommodated under the same roof and if and when separate provisions for an intellectual and/or social élite should be allowed. Those who have been protagonists for separate provisions have usually underlined the criterion of intellectual excellence, explicitly a meritocratic view. But the merit that has to be considered, scholastic aptitude, tends to be amassed in more privileged social strata. Thus, many of both progressives and conservatives conceived the selection problem at 11 in England or at 10 in Germany as one of properly identifying those children in all social strata who had the potential of absorbing the grammar school type of education. The principle was: to everybody his chance irrespective of his social background. The snag, however, was that social scientists, from the 1940s on, began to discover that academic achievements and social background were not unrelated. All criteria used in selecting children for further education - marks, examinations, and test scores - were correlated with social background. The great differences between social classes in participation rates in education at upper secondary

and university level can only to a small degree be accounted for by genetic differences between social classes.

Apart from giving everybody his chance to go ahead in society, the quest for equality has another aspect: In order to work, democracy in the modern, complex technological society requires a citizenry not only with a high level of education, but also with a common frame of reference - that is, common in terms of basic skills, notions, and basic values as well.

A main argument behind the establishment of comprehensive secondary schools in the United States was the melting-pot philosophy. The children of the immigrants should via the school system be brought into the "mainstream". The school gave them either by indoctrination or by implication new civic values. They learned to master a new language which was the basic prerequisite for obtaining a new frame of reference common with those who were already in the mainstream.

In Western and Northern Europe, labor in large quantities has in recent years been imported from the Mediterranean area, that is to say, areas with often rather poor school provisions. Millions of Gastarbeiter or guestworkers have poured into France, the Federal Republic of Germany and Scandinavia, either temporarily or for good. Efforts are made to avoid that the immigrant children become crippled in their mastery of both their mother tongue and the language of their new country. In urban areas, where the great majority of the immigrant workers have settled, teachers, mostly from the home country, on an individualized basis give at least two weekly lessons in their mother tongue and assist the Swedish teachers in taking care of immigrant children in other subjects. Thus, one wants to avoid not only the alienation between the children and their parents that

easily occurs when they find that the new language is the only valued means of communication, but also the downgrading of their background and national heritage that easily follows.

Three Types of Systems.

The two main forces between recent expansion at the secondary and tertiary level have in the first place been the social demand spurred by the increased standard of living resulting from economic growth boosted by the mobilization of highly skilled technical manpower for rapid industrialization. The expansion at the secondary level put the following problem in focus: How much parallelism should be allowed in a system that allegedly is designed to provide equality of opportunity? More specifically, at what age should the students considered to be academically talented be separated from their non-academic classmates? Furthermore, should they transfer to another program in a separate school, to another program in the same school, or simply to separate classes within the same program in the same school? The heading for this set of problems has in the Swedish school debate been "differentiation" (Husén, 1962). It has been at the forefront of the school debate in many other Western European countries during the last few decades.

The starting point of all debates on differentiation is the commonplace observation that pupils differ greatly with regard to abilities and interests. The way such differences have to be taken care of has until recently overtly been conceived almost entirely in pedagogical terms, that is to say, in classroom practices pertaining to grouping and methods of instruction. The debate has

purportedly dealt with the effects of various practices in terms of student competence: What could be considered most "efficient" - restricted ability ranges at the secondary level or more or less unrestricted ranges of ability? But behind this has loomed the growing awareness that basically this is a problem of career opportunities.

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There are essentially three typical solutions to the problem how individual and group differences are taken into account in designing educational systems so as to make provisions for individual differences. These are:

(1) The American model with the primary and then the comprehensive high school which accommodates all or most of the students from a given catchment area under the same roof but with differentiation by means of programs and ability grouping or homogenous grouping within programs. Between-school and between-region diversification is built into the system by provisions for local autonomy and by the existence of parochial schools.

(2) The West European model with a transfer of a selected élite from primary to secondary academic school before the end of mandatory schooling. Such a transfer has until recently typically taken place after 4 or 5 years of primary school but has gradually been postponed by means of the introduction of "orientation cycles" (e.g., in France and Germany) and other practices. In some countries provisions for the entire mandatory school attendance are under one roof, at least in one type of school.

(3) The East European model of a unitary school (Einheitsschule,

école unique) that integrates all types of schools covering compulsory school age, be they academic or vocational.

By no means all national systems of education can be fitted into this Procrustean scheme. But at least most of the systems in the industrialized countries can. Japan, however, could be regarded as a special case due to particular historical and cultural circumstances (OECD, 1971; Teichler, 1976). It offers the paradox of providing opportunities for further schooling for a much higher portion of the young people than most European countries but is at the same time characterized by an internal differentiation and a tough competition for entry into the prestige institutions which goes far beyond the most selective systems in Western Europe. In his book Das Dilemma der modernen Bildungsgesellschaft (The Dilemma of the Modern Educative Society) Ulrich Teichler has described the "educative meritocracy" of Japan and its status-distributive functions.

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The American model. The common public school which provided basic formal education to all children in a given area epitomizes the classical American conception which is represented by Horace Mann of the school spearheading democracy and progress against conservative forces.

The American comprehensive high school was in a way a materialization of the American Dream of equal opportunity. By being exposed to a uniform pedagogic milieu with equal resources and by being mixed with age mates from all social strata and ethnic groups, equality of life chances would in a mysterious way be achieved. But the conception of equality of educational opportunity that emerged from the era of

social Darwinism was beset with a basic dilemma. The massive surveys that were conducted in the 1960s, such as the Coleman report in the United States, the Plowden report in England, and the IEA 20-country study, revealed that social background accounted for more between-student and even between-school differences in student achievement than did school resources. One began to realize that the school cannot at the same time serve as an equalizer and as an instrument that establishes, reinforces, and legitimizes distinctions. There is to a varying degree inherent in the educational system an incompatibility between selectivity and equality. An American educational sociologist, J. Karabel (1972), has stated the problem in the following, somewhat provocative way:

> "The ideology of academic standards brilliantly reconciles two conflicting American values: equality and equality of opportunity. Through the system of public education everyone is exposed to academic standards, yet only those who succeed in meeting them advance in our competitive system. Everyone enters the educational contest, and the rules are usually applied without conscious bias. But since the affluent tend to be most successful, the net result of the game is to perpetuate intergenerational inequality. Thus academic standards help make acceptable something which runs against the American grain: the inheritance of status." (p. 40).

Benjamin Bloom (1976) has been questioning the entire concept of individual differences in achievement which has served as an axiomatic foundation of school practices over the last century when primary schooling has become universal in the industrialized world. Student performances are judged against uniform, linear standards (bright, average, slow learner, or whatever labels we want to use). In such a system some are destined to fail and some to succeed, irrespective of their absolute achievements. A student who belongs to

the bottom group in a school with high standards perceives himself as a failure, even if his attainments by national norms are far above average. Conversely, a student with the same absolute level of performance perceives himself as a success in a school with low standards. Such perceptions are strongly affecting student motivation which in its turn contributes to widening differences in attainments.

Instead of serving as an equalizer of life chances, as envisioned by 19th century liberals, the common school tends to contribute to social differentiation.

The West European model. The West European model has for a long time been characterized by parallelism between the upper grades of the elementary school and the selective junior secondary school. This structure has recently gradually become modified by reduction of the number of parallel grades and increased comprehensivization. In addition, selectivity at both primary and secondary level has operated by means of repetition and dropout. I shall illustrate the model and how it has become modified with four countries: the Federal Republic of Germany, France, England, and Sweden.

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Well into the 1960s the decisive juncture in the educational (and life) careers of young people in Germany was at the age of 10, when transfer on a selective basis took place to the 9-year Gymnasium, which prepared for the university. Some 20-25 per cent were selected for the Gymnasium or the middle school. Of these only one third or one fourth graduated with an Abitur, which served as a uniform entrance ticket to the university.

As pointed out, structural parallelism was combined with repetition

to the extent that it was referred to in the German debate as the Sitzenbleiberelend (repetition misery). Repetition was even more frequent among the select group of Gymnasium students than among those in the Volksschule (primary school).

The pronounced selective features of the German system contributed to the crystallization of the tremendous imbalances between social strata in terms of participation in secondary and higher education. In the early 1960s Ralf Dahrendorf showed that 50 per cent of the university students came from homes of civil servants and professionals, who represented some 1 per cent of the work force, whereas 1 per cent came from working class homes who make up 50 per cent of the work force. The IEA surveys showed that the Federal Republic of Germany had the most pronounced social bias in the social composition of upper secondary school enrollment among all the participating countries (Husén, 1969; Comber & Keeves, 1973).

The reform movement, finally epitomized in the Strukturplan of the German Educational Commission (Deutscher Bildungsrat, 1970) and n the ensuing policy document, the Bildungsbericht (1970), issued by the Brandt government in 1970, contributed to modifications of the parallelism and to lessening of the selectivity. The changes were, however, considerably more modest than envisaged by the proponents of the reform that in the 1970s got stalled in financial and other difficulties (Becker, 1976). A development towards less parallelism was furthered by the extension of schooling up through the junior secondary stage so as to make it universal. In several German states experiments began to be carried out with a "promotion stage" (Förderstufe). Its aim was similar to that of the "observation cycle" in France, namely to postpone a definitive allocation to a particular

academic or non-academic program from the age of 10 or 11 to some years later. In, for instance, the Land of Hesse a program with a 9-year comprehensive school (Gesamtschule) was launched.

The Bildungsbericht envisaged every young person attending school until 16. The soaring enrollment at the German universities led in the early 1970s to a numerus clausus which elicited an enraged debate about fairness and justice in selection and to concerns about the repercussions on the lower stages in terms of performance pressure and competition. Thus, paradoxically, the widening of opportunities has in its wake increased competition at the primary and secondary stages and in selection for university entrance, which was something new in Germany.

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The famous 1959 decree in France, which followed upon a long stalemate of structural reform, modified the selective and differentiating features at the junior secondary level, i.e., the age range 11 through 15. Compulsory schooling was extended from 14 to 16. Provisions were made for an "observation cycle" (cycle d'observation) before the pupils were definitively allocated to different types of secondary schools. The rapid expansion of the collèges d'enseignement général led to making them part of a common system of basic education.

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The 1944 Education Act in England made provision for universal secondary education up to 15. At 11, allocation or rather selection for grammar school education on the basis of academic criteria had to take place. The Act that allegedly was a breakthrough of demo-

cratization of furthergoing education, where places for "scholarship boys" from working-class homes were not any longer reserved, proved not to level out the imbalances between social classes in institutions of post-compulsory education. On the contrary: As Jean Floud (1956) and her coworkers showed, imbalances grew worse, since the middle-class 11-year-olds were more successful in competing for grammar school places than were working-class ones. Thus, British radicals did not look upon the 1944 reform as an instrument of equalizing opportunity as did its liberal proponents. The Labour Party policy has been to comprehensivize secondary education, and in government it has intermittently tried to push the local educational authorities to "go comprehensive" and to abolish the sorting of students at the age of 11. The 11+ examination is gradually vanishing.

The comprehensivization policy, particularly attempts to abolish the 11+ examinations and the practice of 'streaming' at the primary level, has been the prime target of the "Black Papers", authored by a group of conservatives (Cox & Dyson, 1969, 1970). It was maintained that recent changes have brought about a marked decline in standards. The "ideology of egalitarianism" was accused of doing away with the "essential toughness" on which quality depends. A case was made for the élitist system on the basis of research on individual differences conducted among others by Sir Cyril Burt, himself a contributor to the "Black Papers". Burt contended that scholastic aptitude was largely inherited, and sided with the conservatives in defending the élitist grammar school.

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In order to resolve the controversy over parallelism versus comprehensivization, that is to say, how much differentiation and how much unity in school structure is appropriate, policy makers in Sweden in the 1940s turned to behavioral scientists, in the first place to educational psychologists. The case seemed prima facie to be a clear-cut one. Once psychologists had mapped out how individual differences develop, proper conclusions for educational policy could easily be drawn. If differences in scholastic aptitude were due mainly to genetic factors and if schooling could achieve modest modifications only, differentiated provisions had to be made in order to avoid "fighting against nature". The school had to be structured according to the principle: to everybody according to his inborn capacity. On the other hand, if the margin of influence on scholastic aptitude open to environmental factors was large, then schooling could take place in a more unified structure.

The Swedish School Commission, that in its main report of 1948 drew up the blueprint for a comprehensive 9-year school, sponsored a massive research project on "practical" and "theoretical" aptitudes and how they developed in school children (Husén, 1962). Successive age groups from 7 through 16 were tested with extensive test batteries that were then factor-analyzed in order to reveal the "ability structure and factorial maturity". The purpose of this research endeavor was to get an answer to the question as to when the two types of abilities were sufficiently differentiated to allow diagnosis and allocation to academic and vocational tracks, respectively. The investigations indicated, or seemed to indicate, that theoretical or general intelligence was much easier to identify than practical intelligence. It was more simple and unitary, whereas practical aptitude was more complex and

matured later. Academic aptitude could be identified already at the age of 11. But the problem was a substantial positive correlation between the two types of aptitude. About half the unsorted population of 11-year-olds were found to be not decidedly practical or theoretical, whereas about one quarter was predominantly theoretical and one quarter predominantly practical.

Having been given the "facts", however imperfect, one would have expected the Commission to recommend differentiated provisions for the group that could be diagnosed as theoretical. But the snag was, of course, the correlation between the two types of aptitudes. An early differentiation could result in premature decisions taken for many who, for instance, had both a practical and theoretical bent. In addition to consideration to the correlation between the two aptitudes and the later maturation of practical abilities, the Commission advanced a potent political argument in favor of postponed differentiation. If scholastic aptitude were to be the determining factor in allocating students to different tracks at an early age (say 11), the theoretical track would then receive not only students with high scholastic and low practical ability but also the élite who was high on both. This would mean that most of the gifted students would be channeled to professions and that the "manual occupations would be deprived of people with high general ability. This would result in successively lowering their prestige and in creating a gap between social classes and thereby bringing democracy into jeopardy" (Commission Report, p. 70). If the final decision about what "side" in terms of amount of academic schooling a student was to obtain was postponed until the end of junior secondary school, when the special abilities and interests that constitute practical aptitude have matured,

a proper balance between various types of education would be established and all walks of life would get "their share" of talent.

Some generalizations about recent developments in the West European countries can be ventured.

(1) The trend after World War II has been towards comprehensivization of mandatory schooling and gradual abolition of parallel institutions or tracks for an intellectual and/or social élite. This has been achieved by extending the common school, the tronc commun, and by postponing selection for academic élite schools and programs. Certain reforms have gone half way by establishing more flexibility by means of an "orientation cycle" after the primary stage and before the definitive separation between academic goats from non-academic sheep takes place.

(2) Comprehensivization has been spurred by the enrollment explosion at the secondary level, at which, a few decades ago, selective schools catered for 20-25 per cent of the age group or less. The enrollment explosion at the junior secondary level has caused that type of school to be "blown up from within". Universalization of secondary education has contributed to comprehensivization also in terms of widening the range of programs and curricula. Vocational and semi-vocational programs and schools have been integrated with academic ones in the same institutions and under the same roof.

(3) Widened access to upper secondary education has led to increased competition for entry into higher education, where limited access in most countries is the case. This has had repercussions on the lower stages of the system of a paradoxical nature. In spite of widened opportunity competition at all stages has increased, which has led to "performance pressure" and to enraged debates on selection procedures and about marks, examinations, and standardized tests.

The East European model. The East European model, or, since it was first instituted in the USSR, the Soviet model, is based on the notion that differences in scholastic attainments reflect inequalities inherent in the social order of the capitalist class society or are vestiges of such a society. The ruling élite in the capitalist countries is said to have usurped the privilege of having access to high level and high quality education which prepared for leading positions. Thus, in order to give young people from the working class a fair chance to enter the intelligentsia and to become specialists, they should be provided with genuine equality of opportunity within the framework of a unitary basic school common to all children of mandatory school age. The establishment of an Einheitsschule, a unitary school, has therefore been a prime educational goal of the communist parties. Such a school can serve as a major instrument in achieving a classless society.

When Chairman Khrushchev in 1958 introduced the new Education Act to the Supreme Soviet, he revealed that only some 30-40 per cent of the students at Moscow's institution of higher education came from the working class and peasantry, whereas the majority came from the intelligentsia and the functionaries who were a minority in the work force. He expressed concern about this, and suggested that steps should be taken in alleviating these glaring imbalances. His mentioning of group disparities was quite sensational, because according to the officially sanctioned philosophy, education in socialist systems is much more open to advancement of talent irrespective of family and/or class background than in capitalist societies.

Surveys on educational aspirations of Soviet youth and on admissions, attainments and achievements as related to family background

began to be published in the 1960s (Sauvy et al., 1973). Such studies consistently showed a rather strong influence of parental education and parental occupational status on educational aspirations and attainments. No wonder, then, that young people from the intelligentsia were over-represented among applicants for admission to institutions of higher education, particularly the high prestige ones. The surveys further showed that the system of higher education itself was differentiated according to prestige and social recruitment. Some institutions tended to admit a particularly high percentage of young people from homes of the leading stratum.

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The picture we get from Soviet statistics of the tendency of children from more educated and socially more elevated positions to move ahead further in the educational system is to some extent similar to the one we obtain from systems in Western Europe with early differentiation. We find cutting across nations a marked tendency of children from educated background and from socially, but not necessarily materially, privileged background to be heavily over-represented among students admitted to institutions of advanced learning. They are furthermore, once admitted, more successful on all counts: have better marks, lower repetition and dropout rates, and higher success rates in selective examinations. They are particularly successful in getting into prestigious programs which prepare for attractive positions in working life.

It should, however, be pointed out that there are differences in degree between the two systems, the one with early and the one with late school differentiation. The imbalances in the educational system and the ensuing degree of mobility between strata are correlated with

the structure of the basic school system up through the junior secondary years. On the basis of the evidence gained from the IEA 20-country survey two broad generalizations could be ventured:

(1) The earlier the selection takes place for separate academic schools and programs which run parallel to schools and programs for the remainder of students of mandatory school age, the stronger the association between family background and school attainments. Thus, the longer the period of common schooling for all children, the less pronounced the imbalances between social strata.

(2) The more centralization in terms of uniformity of structure and financial resources, the lower the between-school variability in outcomes. In the IEA survey it was found that the between-school variance as related to between-student variance in student achievement among 14-year-olds was 80 per cent in India, 20-25 per cent in England and the United States, and only 8 per cent in Sweden (Comber & Keeves, 1973).

Academic Performance in Selective and Comprehensive Systems of Education.

Two Types of School Structure - Two Educational Philosophies.

The reason for the passion that often has gone into the debate on the comprehensive versus the selective school is that it is not merely didactic principles or methods of organizing the curriculum that are at issue. At the heart of the matter we find two opposing educational philosophies. On the one hand, we have the egalitarian and reconstructivist view, and on the other, the élitist view of the educational system.

A comprehensive system provides a publicly supported school education for all children of mandatory school age in a given catchment area. This means that all programs or curricular offerings are provided in the same school unit. Another essential feature of comprehensiveness is that no differentiation or grouping practices that definitively determine the ensuing educational and occupational careers are employed. Children from all walks of life are taken care of.

In a selective system children are by means of organizational differentiation at an early age allocated to different types of school, and, also at an early stage of their school career, grouping practices are employed aiming at spotting those who are supposed to be particularly academically oriented. Apart from selective admission and grouping, the system is also characterized by a high attrition rate in terms of grade-repeating and dropout.

In the debate on the relative merits and drawbacks of the two systems it has been maintained, on the one hand, that the top students in a comprehensive system will suffer by having to be taught together

with their more slow-learning peers. This will impair their standard of achievement in comparison with students of equal intellectual standing in systems where an organizational differentiation in terms of selection for separate academically oriented schools takes place at an early age or where strict homogeneous grouping within the school is employed.

The adherents of comprehensive education, on the other hand, maintain that the top students will not suffer as much in their system as the great mass of the less academically-oriented students in a selective system, particularly those who rather early are left in the elementary school after the "book-oriented" have been selected for the university-preparing secondary schools.

The élitists maintain that a system of selection based on fair and equally employed criteria of excellence will open the avenues to high-status occupation to those from all walks of life who deserve it by possessing the necessary (mainly inherited) talent. The comprehensivists counter by claiming that a selective system is beset with a greater social bias than the comprehensive one. As one moves up the ladder of the formal educational system the proportion of lower-class students is much lower in a selective than in a comprehensive system, which is interpreted as evidence for bias.

The two propositions, both the one on the standard of the élite and the one on social bias, were tested on national systems of education in the first two large-scale surveys conducted by IEA (Husén, 1967; Postlethwaite, 1967; Comber and Keeves, 1973). The national systems of education differ tremendously with regard to the size of the pre-university group (in per cent of the relevant age groups). In the mathematics study this group varied from less than 10 per cent

in some European countries to more than 70 per cent in the United States. In the Science study the variation was by and large of the same order of magnitude. The variability in Europe had, however, decreased somewhat. Evidently, there is no point in making comparisons between mean performances behind which there are school populations representing such variations in terms of the proportion of the relevant age group. Thus, it was decided to take advantage of the IEA survey data for Population 4, that is to say, students who are in the terminal grade of the pre-university school. Typical national illustrations of this population are for instance the Oberprimaner in Germany, the students who are about to sit for the GCE level in England, and for the baccalauréat in France.

The problem of "comparing" the terminal students is not as simple as it might appear from the popular debate on the relative "standard" of secondary systems with a rather strict selection versus those with an open door policy. The problem of whether the one or the other system is to be preferred is a matter of what criteria one wants to employ in evaluating them, and therefore in the last run a question of political preferences. Even if the evaluators can agree upon what criteria should be employed, they will certainly put them in different orders of priority. The adherent of an élitist system tends to evaluate the schools in terms of the quality of their end-products, either leaving out those who are lost in the selection and/or attrition process or attaching a lower priority to their educational fate. The comprehensivist prefers to look at what happens to the great mass of students. His overriding question is: How many are brought how far?

Standard of the Elite in Mathematics.

In what follows we shall focus on the standard of the élite in the industrialized IEA countries, using as our criteria achievements in mathematics and science at the pre-university level. The national systems which have been studied vary considerably with regard to retention rate of "holding power" at the upper secondary level. The high school seniors consist of some 75 per cent of the relevant age group in the United States, those who finish gymnasium and continuation school in Sweden (grades 11 and 12) are some 45 per cent of the age group, the Oberprimaner (grade 13) in the Federal Republic of Germany are some 10 per cent etc. It is rather pointless to limit a comparison of student achievements in these and other countries to mean performances, simply because of the highly variable portion of the relevant age group we are dealing with. It is more nearly fair to compare equal portions of the age cohorts.

But such comparisons are conducted under the assumption that those who are not in school at that age level have not, either by previous schooling or other learning opportunities, reached the level of competence achieved by the élite still in school. On the basis of analysis of the distributions of achievements, both

at the beginning and at the end of secondary school, we concluded that had the ideal conditions of being able to test the entire age group existed those who were not in school would not have scored high enough to affect the means for the top 5 per cent of the age group.

The objection has been raised that the method of comparing equal portions of the age group is unfair to national systems with a low retention rate (or high selectivity). The validity of such an objection can be questioned on pure logical grounds, simply because

it is not consistent with the élitist philosophy. In systems where until recently only some 5-15 per cent of the entire age group is retained up to the pre-university grade, the prevailing educational philosophy has been that such a system rather efficiently takes care of most of the able students and does not bias against any category of them. Thus, those who favor an élitist system cannot reasonably object to a comparison between equal proportions of the age group by maintaining that the comparison is unfair to the selective system because it does not retain the able students.

When in the IEA mathematics study (Husén, 1967) the average performance in different countries of terminal students taking mathematics was compared, we found that the US high school graduates were far below the other countries. However, in the US 18 per cent of the age group of 17-18-year-olds took mathematics as compared to 4-5 per cent in some European countries. In order to arrive at an answer to the question to what extent it is possible to produce an élite in a comprehensive system, one has to compare <u>equal proportions of the relevant age group</u> in the respective countries. The dotted line in Figure 1 gives the average performance of the terminal mathematics student in the twelve countries. The solid line gives the averages for the top four per cent of the total age group. This percentage was selected because it represented the lowest proportion in any one country taking mathematics. As can be seen, the range between countries is more narrow than for the entire group of terminal mathematics students. The US top four per cent score at about the same level as the corresponding group in other countries.

On the basis of the distribution of total score of the terminal students in all countries, international percentile norms were obtained.

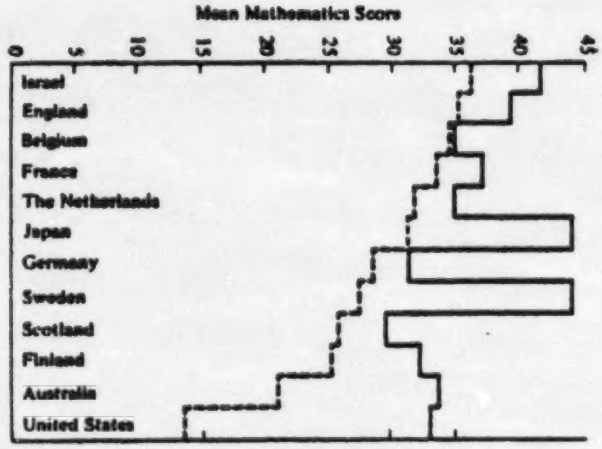

Figure 1. *Mean Mathematics Test Scores* (1) *for the Total Sample and* (2) *for Equal Proportions of Age Group in Each Country for Terminal Mathematics Populations*

——Average mathematics test score for equal proportions of age groups
- - - -Average mathematics test score for country

Source: T. Husén (Ed.): International Study of Achievement in Mathematics: A Comparison Between Twelve Countries. New York: Wiley, 1967.

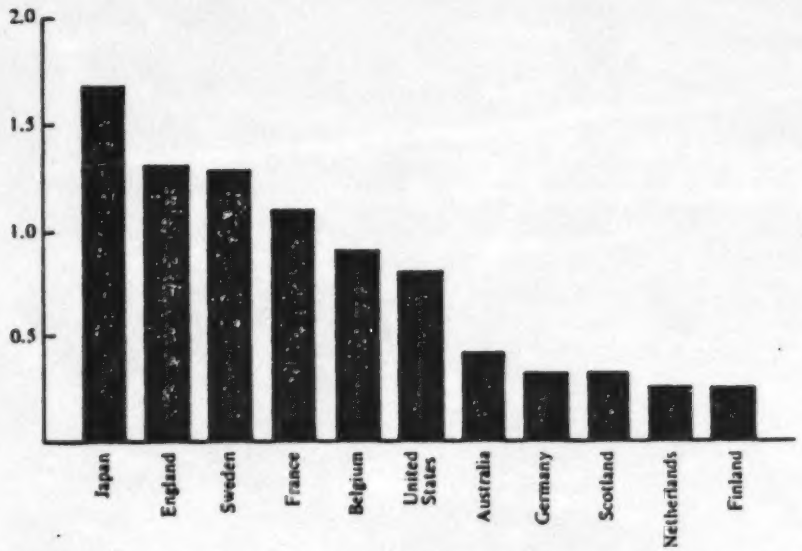

Figure 2. ***Percent of Age Group Reaching Upper Tenth of Terminal Mathematics Pupils by International Standards***

Source: **T. Husén (Ed.): International Study of Achievement in Mathematics: A Comparison Between Twelve Countries. New York: Wiley, 1967.**

In Figure 2 we have given the percentage of the total age group within each country which has reached the standard of the upper tenth of the terminal mathematics students. As can be seen, none of the systems with high retention rates and/or a comprehensive structure are among the five systems at the bottom.

Standard of the Elite in Science.

Similar comparisons were conducted with terminal students in science (Comber and Keeves, 1973). In this case all the Population 4 students were included in the comparisons, irrespective of whether they were or were not taking science in the grade when testing took place. It was decided to compare the top 9 per cent of Population 4 in the industrialized countries. This percentage was chosen because it represented the lowest proportion in Population 4 of the relevant age group in any of the countries. In order to arrive at measures of the two more limited élites, the top 5 and 1 percent were also chosen. Figure 3 presents the outcomes of the comparisons for the three élite groups. The mean score for the entire graduate population ranges from 30.8 for New Zealand to only 14.2 for the United States. The Population 4 students represent 13 per cent of the entire age group in the former country as compared to 75 in the latter. When the mean scores for the top 9 per cent were compared, it was found that countries with a high retention rate got sharply increased means. The United States doubled its mean and scored higher than, for instance, Germany and France. By and large, the same picture emerged when countries were compared with regard to the top 5 and 1 per cent of the students.

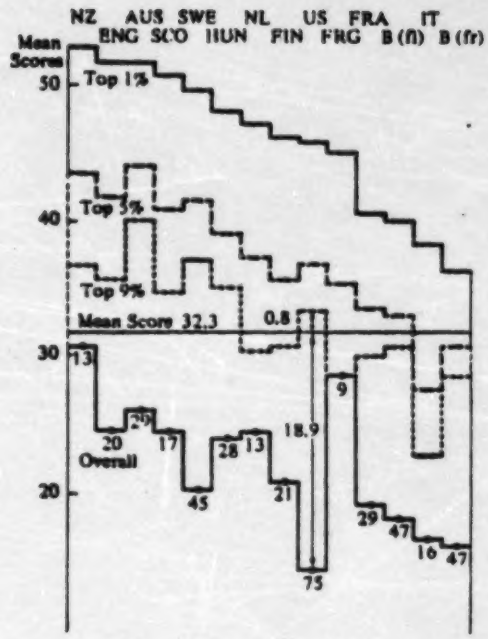

Figure 3. ***Science Mean Scores of Top 1%, Top 5%, Top 9% of an Age-Group and of Overall Group***

Source: **L. C. Comber and John P. Keeves: Science Education in Nineteen Countries. Stockholm and New York: Almqvist & Wiksell and Wiley-Halsted Press, 1973.**

The assessment of the standard of élite students at the pre-university level does not support the contention that systems with broader or more open access and with relative high retention rate until the end of upper secondary school do not succeed in "producing" élite students. An élite can be cultivated within a comprehensive educational system. Whether or not an élite produced in the latter system is worth its price is another question.

In selective systems the high standard of the élite is often bought at the price of limiting opportunities of the mass of the students. By comparing the distribution of father's occupation at the 14-year-old level with the one at the pre-university level, it is possible within each country to arrive at an estimation of the amount of social selection that operates between the two levels. An index of social disproportion was derived from the proportion of students with fathers who belonged to the professional and managerial category on the one hand and the semi-skilled or unskilled category on the other. The index was unity when the upper and lower strata have the same representation at the pre-university level as at the 14-year-old level. The index was 1.3 and 2.4 respectively for the United States and Sweden, two countries with relatively comprehensive and retentive systems; whereas it was 7.9 for England and as high as 37.7 for the Federal Republic of Germany, where the systems are much more selective and less retentive. An index of dissimilarity between socio-economic strata developed by Anderson (Husén,1967) gives by and large the same results. Table 1 gives the percentages for the two contrasted status categories. Since the categorization has not been consistent over countries, comparisons should be made between levels within

Table 1. Percentage of Pupils Within Each Population From Selected Categories of Parental Occupation

	Population I (10-year-olds)		*Population II (14-year-olds)*		*Population IV (17–19 year-olds)*	
	Professional & managerial	*Unskilled & semi-skilled workers*	*Professional & managerial*	*Unskilled & semi-skilled workers*	*Professional & managerial*	*Unskilled & semi-skilled workers*
England	16	21	14	14	38	5
Fed. Rep. of Germany	13	7	14	8	49	1
Finland	9	35	10	34	20	15
Hungary	15	43	20	36	38	18
Netherlands	26	12	20	12	55	5
Sweden	23	31	26	27	35	15
USA	24	18	31	16	34	14

Source: L. C. Comber and John P. Keeves: Science Education in Nineteen Countries. Stockholm and New York: Almqvist & Wiksell and Wiley-Halsted Press, 1973.

countries. One should notice the low representation in England and the Federal Republic of Germany of students with working class background at the pre-university level. The overall conclusion from the comparisons is that the comprehensive system, by its openness, lack of selective examinations during the primary and initial secondary school period and its high retention rate, is a more effective strategy in taking care of all the talent of a nation. By casting a net as widely as possible an attempt is made to "catch" an optimum number of fish. A selective system with early separation of students who are rated to have academic potential is destined to produce good end products. But this advantage is bought at the high price of excluding a sizeable number of students from lower class homes from further education and of limiting the opportunities for the great mass of students to get access to quality education.

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